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A New Interpretation of Ptolemy's Germania Magna: Employing Computer-Assisted Image Distortion of a Medieval Map by Donnus Nicolaus Germanus to Examine Post-Glacial Geodynamics in Europe

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Abstract
This paper revisits Claudius Ptolemy's depiction of Germania Magna through a multidisciplinary approach, integrating computer-aided distortion analysis of Donnus Nicolaus Germanus's medieval cartography with geological insights. The study proposes that the region underwent significant and complex transformations, likely influenced by tectonic activity, such as the reactivation of the Caledonian Deformation Front (CDF), a major geological structure in Europe that separates ancient orogenic belts, and possibly by cosmic events like the Chiemgau impact, a proposed meteorite impact in southern Germany.

A reevaluation of Germanus's map, aligned with modern cartographic data, challenges long-held interpretations of Germania Magna's boundaries. The analysis suggests that Ptolemy's Vistula Fluvius corresponds more closely to the present-day Schwarze Elster in Germany rather than the Vistula River (Weichsel) in Poland. Building on this reinterpretation, the study further examines the potential regression of the Oceanus Germanicus, attributing it to tectonic shifts, volcanic activity, or changes in relative sea level. These environmental processes may have profoundly shaped settlement patterns and cultural development, influencing not only coastal areas but also extending to all regions of Germania Magna, as communities presumably adapted to substantial environmental changes.

By situating Germania Magna within the broader framework of geological, cosmic, and climatic phenomena, this study offers new insights into pivotal events and processes that could have shaped the environmental and cultural landscape of Northern and Central Europe in antiquity. It aims to encourage further interdisciplinary research and a critical reassessment of historical and archaeological interpretations.

Key words: Germania Magna – Claudius Ptolemy – Geographike Hyphegesis – Nicolaus Donnus Germanus – Vistula Fluvius – Oceanus Germanicus – Caledonian Deformation Front – TESZ – Avalonia – Baltica – Laurentia – Albis Fluvii – Budorigum – Calisiua – Stragona – Scandia – Nomisterium – Sudete Monts – Schwarze Elster – Black Elster – Halley's Comet – Chiemgau Impact – Meteorite Imapact – Fläming Heath – Oderbruch – Zilterndorfer Niederung – Celts – Goths – Vikings – Iron Age – Merovingian dynasty – Odergermanische Gruppe – Thuringii – Thuringians – Thüringer Reich – Baltic Sea – North Sea – Tectonics – Geology – Volcanism – Alpine Orogeny – Climate change – Iron Age Cold Period – Volcanic Winter of 536 – Migration Period – Little Ice Age – Tsunami – Northern Europe – Central Europe – Germany –

1 Introduction

In his draft for the *Reinterpretation of **Claudius Ptolemy**'s Germania Magna – Using Computer-Aided Distortion Analysis of a Medieval Map Representation by **Donnus Nicolaus Germanus** – and Considerations of Post-Glacial Geodynamics of Europe*, the author describes his assumption that Germania Magna underwent a far more extensive landscape transformation in geologically recent times than previously assumed. This transformation may have been caused by post-glacial land uplift in the Holocene or potentially by a reactivation of the *Caledonian Deformation Front* (CDF) during a late activity phase of the Alpine orogeny, accompanied by tectonic activities in the upper Earth's crust. Additionally, the possibility that a cosmic impact event triggered such a reactivation of the CDF is not excluded.

The conditions expected to justify the described process likely align with hitherto misattributed or incorrectly dated large-scale fracturing events, which might have led to significant earthquakes in Central Europe over several centuries. These seismic events may even have been documented in medieval historical records.[1]

2 Map Description

The territory of historical *Germania Magna*, as described by Ptolemy, corresponds in this interpretation broadly with the territory of present-day Germany but excludes areas of modern Poland, as some earlier interpretations have suggested. During the Holocene, probably still in the early Iron Age, significant parts of the *Central European Basin* may have been submerged under a shallow shelf sea. On Ptolemy's map, the Jutland

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[1] cf. Meier (1998)

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Figure 1. The EVROPA TABVLA QVARTA – Quarta Europe Tabula continet Germaniam cum insulis sibi adiacentibus. The medieval map representation of Germania Magna, attributed to Donnus Nicolaus Germanus, is very likely based on the work of Claudius Ptolemy.

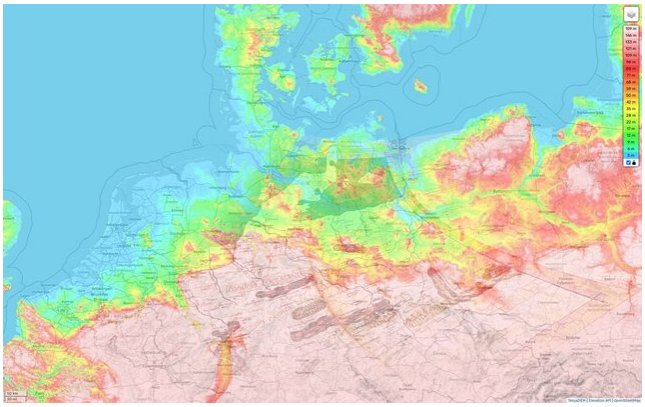

Figure 2. This image presents a colored representation of current elevation data (DGM), overlaid in an initial attempt with the Germania Magna map by Donnus Nicolaus Germanus. The elevation data is displayed in a gradient, highlighting the topographical features of the region, while the historical map provides a visual reference to the ancient geographic understanding of the area. This preliminary effort aims to explore potential correlations between the modern terrain and the depiction of Germania Magna in historical cartography.

Peninsula (modern Denmark) appears either disconnected from the mainland or not yet formed as a discernible landmass.

In the east, the historical *Germania Magna* was bordered by the Sarmatian Mountains (*Sarmate montes*) and further by a river designated as ***Vistula Fluvius***, in the south apparently by the Danube (*Danubii* or *Danubius flu.*) and in the west by the Rhine (*Renus fluvius*). The latter two rivers initially serve as the most important reference points (reference lines) for further interpretation, as they appear to be the most unambiguous and roughly correspond to their present-day course. The coastline to the *Oceanus Germanicus* is located about 150 kilometers further south compared to today, just north of present-day Berlin.

Figure 3. A possible course of the *Vistula Fluvius* might have partially corresponded to the current course of the *Schwarze Elster*, which, at that time, would not have flowed westward into the (present-day) *Elbe* (*albis fluvii*), but might instead have initially made a bend to the east, following later the course of the *Lusatian Neisse* from around *Guben* and continuing into the riverbed of the *Oder* River. For example, at the confluence of the *Schwarze Elster* and *Spree* rivers, which the author initially identifies as the depicted rivers, a medieval fortress (Peitz Fortress) was built in the present-day town of *Peitz*. It is known that this fortress was surrounded by an old arm of the Spree. Further geological investigations may help clarify this in the future. The location of *Stragona* could possibly be assumed near the present-day town of Herzberg/Elster (in the district of Elbe-Elster), and *Budorigum* near Doberlug-Kirchhain. It remains questionable whether the *Elbe* can actually be identified with its current course, or whether the map rather depicts the course of the *Weiße Elster* further west. In that case, the location of *Nomisterium* might be found near Leipzig, or further south toward Gera.

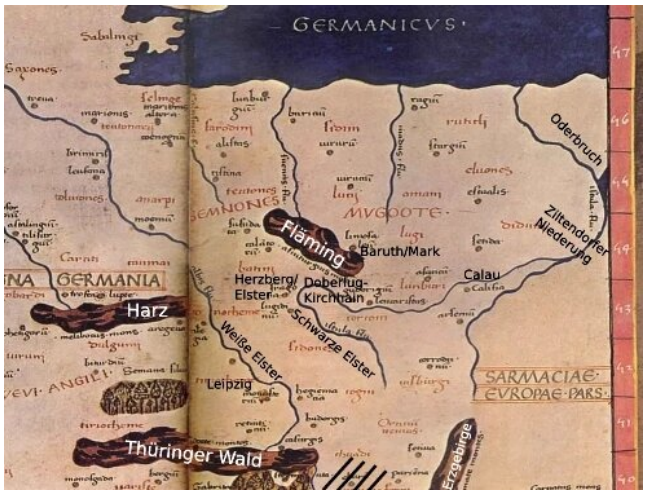

Figure 4. The location of the *Vistula Fluvius* (Schwarze Elster) on the Germania Magna map, with the Oderbruch and Ziltendorfer Niederung situated in the far east of the map. A transform fault may run here, which could have been caused by a partial thrusting of Avalonia onto the Baltic continental plate (cf. Jiang et al. (2022)). Oderbruch and Ziltendorfer Niederung could therefore have originated from an earlier valley depression, which was pulled apart or offset along a transform fault.

This assessment results from maintaining the geometric length ratios, using the two reference points on the map (Rhine and Danube) as mentioned above, together with the *Asciburgius Monts*, identified by the author as the *Fläming*, as a further important reference area, with the modern city of *Baruth/Mark* (*Limios alsos*) in the north-east of the elevation — but also with the Oderbruch or the Ziltendorfer Niederung on the eastern edge of the map.

Consequently, the mouth of the *Vistula Fluvius*, which is intended to serve as another reference point, would have been located further south than previously assumed in earlier interpretations. The southward shift of the river's mouth allows for a more accurate localization, providing a more reliable reference point for cartographic overlays (***Figure 2***). Such an overlay also suggests — roughly maintaining the aspect ratios — that the Vistula, at least in sections, probably corresponds more to the *Schwarze Elster* (Black Elster) today, rather than being identical to the modern Vistula River in Poland (***Fig. 3***).

2.1 Etymological Derivation of the Term "Vistula"

It is possible that the Greek term *Oustoúla* was originally adopted from Latin (i.e., by the Romans), with even older roots potentially found in the Celtic language or that of the *Jastorf Culture*. In Latin, the word **ustula** is the imperative of **ustulō** and means *to burn something*, *to scorch something*, or also *to consume something with fire*[1] – here to be understood as an order to someone or something ***to char or smolder something***. There is probably also a closer connection to metalworking (especially charcoal burning), which is particularly indicated by the English cognate *ustulate* – as an adjective meaning **blackened** or **burnt** (*Blackened as if burned*)[2] and as a verb directly referring to the *burning or roasting of ores*[3] (actually two different processes).

The naming of the river likely referred originally to the smoldering of wood, or directly to the phenomenon of "**smouldering fire**" (German: *Schwelfeuer*), as in a charcoal burner used to produce charcoal for bloomery furnaces.

As a corresponding possibility of confusion in English, it also refers to the subsequent smelting process, in which the charcoal actually serves (only) as a fuel (*ustulate* in English as a verb, therefore incorrectly not in the sense of something "smoldering" or in relation to "charcoal burning", but – on the contrary, with a strong flame and maximum oxygen supply! here rather to an (more or less arbitrary) example application of the previously obtained charcoal). In contrast, the adjective refers to the color and burning properties of charcoal (which is therefore black, but still combustible, *ustulate* in English as an adjective).

In this context, the word "pyrolyze" (from pyrolysis) is probably a modern equivalent for essentially the same process, which was probably already described by **ustulō**, although here one might also speak of "coking" or "carbonization".

The current name ***Schwarze Elster*** (*Black* Elster) for part of the historical *Vistula Fluvius* (Oustoúla) could therefore still be a derivation of the original landscape description from the

[1] Charlton T. Lewis and Charles Short (1879) A Latin Dictionary, Oxford: Clarendon Press
[2] "*ustulate*", in Webster's Revised Unabridged Dictionary, Springfield, Mass.: G. I & C. Merriam, 1913
[3] Wiktionary (2023)

Figure 5. AI-generated scenario showcasing an illustrative depiction of an Iron Age settlement nestled along the Vistula River. The villagers likely lived in a region shaped by charcoal production, which may have been a cornerstone of their economy. It is conceivable that charcoal was also exported from this area. Along the riverbanks, numerous fire pits or charcoal kilns might have dotted the landscape, their rising smoke shrouding the surroundings in a misty haze.

Figure 6. Another AI-generated scenario illustrates a village situated close to the river to optimize the transport of charcoal. During the pre-Roman Iron Age cold period, the increasing demand for reliable fuel likely made this region an important source of charcoal exports. The warming influence of the Gulf Stream resulted in more snow-free days here compared to regions further inland. Timber from nearby forests was harvested and processed into charcoal in numerous kilns. Boats would have transported the charcoal downstream toward the *Oceanus Germanicus*, supplying settlements along the route, as well as more distant destinations, with the fuel needed to endure colder conditions.

Germanic or Roman period – a description of the river and settlement landscape and probably also of particular features, such as a foreign visitor could have noticed conspicuously on site (e.g., a cartographer or a Roman military officer).

Perhaps something like this, as in this AI-generated example scenario for a Germanic village situated by a minor tributary of the *Vistula Fluvius*, producing charcoal for metal extraction (*see* ***Figure 5*** *and* ***Figure 6***):

Particularly during winter months, when the days in Germania Magna are short, and the nights are cold, the sight of smoke and fire would have been striking in the frost-laden, marshy landscape. Visitors from distant Greece or traveling merchants passing through from the north, bringing

Figure 7. The etymological derivation of *ustulō* (from Vistula): It could serve as additional evidence for the previously hypothesized convergence and cultural exchange between members of the Latin (or proto-Latin) and Finno-Ugric language families, which may have influenced each other in the *Vistula Fluvius* region. Possibly as early as the early Iron Age (see *Hallstatt culture*), coinciding with the beginning of charcoal use for iron production in bloomery furnaces (at the geographical language border between the two language families).

amber jewelry to Rome, were likely accustomed to a warmer, Mediterranean climate and urban life in larger cities. Perhaps here in the cold, there was an impressive experience for such a guest – possibly doubling as a translator and cartographer – and even if communication was not so easy, in this inhospitable area, at one of the many fires in the village, they may have tried to talk about this black wood that looks like it had already been burned. It would have been conceivable, just as it steams and smokes from everywhere. The damp fog that pulls over the field from the meadows and almost completely conceals the forest also suggests it: "There must be a lot of fire in this place." Perhaps the river itself seemed to boil beneath all that rising smoke, obscuring the entire landscape.[4] *(**Figure 7**)*

Thus, we may arrive at a more precise derivation for the Latin ***ustulō***: in the context of charcoal production and use, not only for metal extraction (a connection to English, as outlined above in detail), but also for ***ritual incense burning*** (referencing Greek[5], understood here as "*a small form of incense*", cf. *frankincense*). From Romanian, it could possibly be inferred that the landscape on the Vistula at that time might have been particularly plagued by mosquitoes when the term (per)*ustulo* entered the language.

Hypothetically, a suitable time frame for such an event could be a period during the (pre-Roman) **Iron Age Cold Period**, approximately between 900 and 300 BC, with potentially colder climatic conditions than during the *Little Ice Age* of the later Middle Ages.[6] The demand for firewood by Nordic civilizations and island inhabitants, who may have settled closer to the Arctic Circle (or generally in colder areas less favored by the Gulf Stream), **could have exceeded the local tree resources due to this cooling**. As a result, the import of fuel from southern regions might have become necessary.

Charcoal, having a significantly lower volumetric weight compared to wood, could have been the preferred material for transport to the north, initially by boat and later, likely on foot. With the appropriate interpretation of Ptolemy's map or records, it could additionally be assumed that the Sarmatian peoples east of *Germania Magna* had a close linguistic relationship with the Finno-Ugric peoples, such as the Sami.

Naturally, these are highly speculative assumptions intended to support the etymological derivation of ***ustulō***. However, it could serve as additional evidence for the previously hypothesized convergence and cultural exchange between members of the Latin (or proto-Latin) and Finno-Ugric language families, which may have influenced each other in this region. Possibly as early as the early **Iron Age** (see **Hallstatt culture**), coinciding with the beginning of charcoal use for iron production in bloomery furnaces (at the geographical language border between the two language families).

The bloomery (or the use of the bellows to kindle the fire from the glowing charcoal) could be symbolic in this context for the *Sampo*[7] forged by *Ilmarinen*, at least on a smaller scale – in a worldly sense. As a reflection of cosmic forces that in their entirety, however, elude our imagination.

3 Possible Causes for The Landscape Transformation Described in This Interpretation

Which geological processes led to a possible regression of the ***Oceanus Germanicus*** is not the primary subject of this interpretation, but the author suspects several factors here, which have already been outlined in the draft publication and which could form a common cause for this. According to the latest considerations, however, the reactivation of the CDF in the course of a late activity phase of the Alpine orogeny (i.e. in more recent times) seems to be a possible main cause. During this event, tectonic forces caused *Avalonia* to be thrust northward onto the *Baltic continental plate* , possibly depressing it (potentially a beginning subduction, but temporally limited and regionally restricted to the eastern part of the *Avalonian continental plate*). As a result, the relative sea level (RSL) along the North German coast would have fallen, leaving areas of the *Oceanus Germanicus* (on the *Baltic continental plate*) submerged below sea level.

Both *Mount Vesuvius* and *Mount Etna* in Italy, as well as the volcanoes on Iceland, have experienced several large eruptions in the last 3000 years. The famous eruption of *Vesuvius* in 79 AD, which destroyed *Pompeii*, can serve as an

[4] see *Additional Notes* on the Geography of Germania Magna for more information, Germania Magna Website, www.germania-magna.de

[5] see CRATÈRE (musée du Louvre) -430 / -420 BC, peintre de Pothos, Athènes, CA 307 ; G 496, Département des Antiquités grecques, étrusques et romaines

[6] cf. Dansgaard et al. (1969)

[7] Additional Media References in this context:

- Sampo (Film, Sowjetunion, Finnland, 1959)
- Rauta-Aika (The Age of Iron, 1982)
- The Forging of the Sampo by Väinö Blomstedt [fi], 1897
- The Forging of the Sampo, tempera by Joseph Alanen, 1910–1911

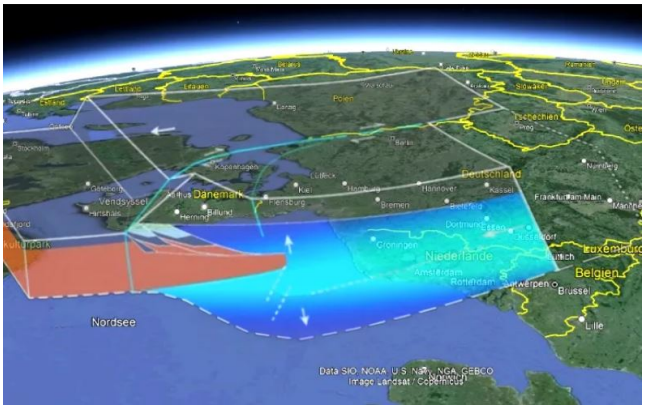

Figure 8. The previously described situation, applied here in a figurative sense to the considered area of Germania Magna: According to this, the formation of fault zones, such as the Elbe-Lineament, which could have arisen in connection with the presumed uplift of the North German coastal area (with the overthrusting of Avalonia) or the shortening of the continental crust in the interior of the country, which may also be connected with the formation of significant graben structures between the Alps and the Oceanus Germanicus, can possibly also be explained. At the same time, the stronger bulging of the crust between the Netherlands and the North Sea area could have led to a subsidence of the lithosphere (isostasy), with the possible consequence of a change in the tilt of the ground surface and the further uplift of the Ore Mountains as a fault-block mountain range. (North here on the left side of the image, Google Earth Pro, 2024)

example. This could suggest a generally high level of geological activity in Europe, which may have led to stresses in the lithosphere and could have potentially triggered or intensified continental drift, even at previously inactive plate boundaries.

A cosmic event with significant tectonic effects is also not entirely ruled out as a possible cause. Such an event could have generated or resolved lithospheric stresses formed tens of thousands of years earlier due to the weight of large glacial ice sheets. It is also conceivable that a situation similar to the one observed on *Jupiter* in 1994 occurred[1], where fragments of the comet *Shoemaker-Levy 9*, after breaking apart, struck the planet's surface in succession. A similar event – though likely of a lesser magnitude – might also have occurred on Earth within the last 2,000 years. Such an event could potentially be associated with *Halley's Comet*, which appeared, for instance, in 530 AD. In 607 AD, *Halley's Comet* was described alongside three other comets [2], which might have been (other) fragments of a larger parent body. According to Babylonian texts, the comet passed close to Jupiter in 164 BC, potentially breaking into several larger pieces. Over subsequent centuries, these fragments could have entered highly divergent orbits due to their size (mass) and the gravitational influences of other celestial bodies.

The impacts of one or more cosmic objects on Earth's surface could have contributed to the *climatic anomaly between 536 and 550 AD*[3], a sea-level change, desertification in North Africa, and increased volcanic activity. There may also be a possible connection to the Nordic description of a *Fimbulwinter*.

Prokopios of Caesarea wrote in his "Historien IV 14" about this time:

[. . .] during this year a most dread portent took place. The Sun gave forth its light without brightness, like the moon during this whole year, and it seemed exceedingly like the Sun in eclipse, for the beams it shed were not clear. - cf. Ahmed et al. (2013) about *"Continental-scale temperature variability during the past two millennia"*[4] here too, and Dansgaard et al. (1969) with *"One Thousand Centuries of Climatic Record from Camp Century on the Greenland Ice Sheet"*.[5])

A connection to the *Great Earthquake of Antioch in 526 AD* is also conceivable here, like Michael the Great of Syria concerning the year 525 in his *World Chronicle*:

The sun became dark and its darkness lasted for 18 months. Each day it shone for about 4 hours, and still this light was only a feeble shadow. Everyone declared that the sun would never recover its full light. The fruits did not ripen and the wine tasted like sour grapes. In the year A.D. 626, the light of half the sphere of the sun disappeared, and there was darkness from October to June. As a result people said that the sphere of the sun would never be restored to its original state. During this time, the waters of Shiloh disappeared for 15 years. In this period, fire also fell from the sky and burned the city of Balbek—which had been built by Solomon on Mount Lebanon—as well as its palaces. Yet three stones, which Solomon had placed there as a symbol of the mystery of the Trinity, remained untouched. During the same time, a woman appeared in Cilicia who was a cubit taller than any man and spoke no language. However, she ate human food. She lived for a long time by receiving money from all the shops but then suddenly disappeared. Some said she was a nymph. In the year 836 of the Syrian era (525 AD), Asklepios, a wicked and corrupt man, was the bishop in Edessa, and he pressured the faithful to accept the unholy Council of Chalcedon. He had 20 miraculous coenobites arrested, cruelly tortured them, and threw them into prison. It happened that, on the second evening, a great flood came down from the mountains. It struck the city walls and receded. The second time, it broke down the walls and flooded the city, killing people and animals by dragging them into the Euphrates. Asklepios saved himself by fleeing into the city's citadel, as did some others. The people wanted to stone him because they knew he was responsible for this calamity, so he fled to Antioch. There, his fellow sectarian Ephrem, Patriarch of Antioch, said: 'Behold, brothers, our second Noah has escaped the flood that came because of the sin of not accepting the Council of Chalcedon.' Justin sent much gold to rebuild Edessa. When they dug, they found an inscription on a stone that read: 'Three times will a flood strike Edessa.' This was written in Chaldean script. Thirty thousand bodies were recovered from the flood, while the city's inhabitants estimated the number of those lost to the waters at 200,000. Asklepios

[1] cf. Video Documentation: "*Wonders of the Universe*": Episode 9: "*Once In A Lifetime*", by David Taylor, TLC U.S./Discovery Channel, YORK FILMS OF ENGLAND, UK, 1995
[2] Yeomans (1991)
[3] Abbott et al. (2014)
[4] Ahmed et al. (2013)
[5] Dansgaard et al. (1969)

and Ephrem amused themselves by defiling Antioch with this vile heresy. This brought even more of God's wrath upon the city. A fifth earthquake shook the entire city, and all buildings, houses, palaces, and churches collapsed. A completely new phenomenon was observed as the wind brought the punishment of Sodom. The river boiled over, and black waters emerged from the depths, carrying crabs, turtles, and the bones of wild animals. The earth spewed fire and water, and deadly fumes rose, bringing death to humans and animals through various afflictions. For several days, fire rained down from the sky like rain. Everyone could hear the screams, but no one dared approach. For one and a half months, the earthquakes and fiery rain continued unabated. The great basilica built by Constantine shook for seven days like a reed in the wind until it split, and fire rose to burn the church. Only 1,250 souls survived these catastrophes. Suddenly, a radiant cross appeared in the sky and disappeared after three days. The people cried out, 'Lord, have mercy, Lord, have mercy.' Other regions were also destroyed: Seleucia in Syria by the sea, the city of Daphne, as well as a region twenty miles around Antioch, Anazarbus, the metropolis of Cilicia, and Corinth, the metropolis of Greece. Thus, many people and buildings were lost during the evil years of Justin's reign.

In Central Europe, such an event might correspond with the collapse of the *Thuringian Kingdom* around the year 531. It could offer a rather plausible explanation, especially when considering that there seems to be little evidence so far of any major military conflicts between the Thuringians and the Franks - as Bemmann (2023) observes[6]:

"[. . .] There were no Frankish military bases on strategically elevated positions, no Frankish military, and no Frankish elites in Central Germany. Integration into the Frankish Empire between 531 and 630 cannot be demonstrated archaeologically. Even if the traditional master narrative accurately described the core of the process and there had been Frankish military stations with garrison troops, these would, judging by the size of the burial grounds, have consisted of only a few men. They would have been hopelessly outnumbered and, in a society without a monopoly on violence where weapon ownership was widespread, would have had no chance of survival. [. . .]" ,

and Volkmann (2013)[7]:

"[. . .] The idea of a gradual transformation is likely only applicable, based on the available archaeological findings, to the Roman Imperial period in the western border regions near the limes, for example in the context of the Romanization of local Germanic groups. However, the findings from the study area (Fig. 1) point instead to drastic upheavals at the end of the Roman Imperial period and during the Migration Period, which in some cases occurred within just a few decades or even years [...]. These processes are not consistent with gradual transformation but rather indicate clear discontinuities resulting from nonlinear changes. In the archaeological evidence from the Migration Period in the Oder region (5th–7th centuries AD), dramatic and deeply impactful processes seem to be reflected. Therefore, the thesis of gradual transformation processes is not applicable to the focused period or the study area [. . .]" .

At least, there could be another possible connection to *The Annolied* here, likely written between 1077 and 1081 by a monk from Siegburg, contains lines that may hint at one or even two well-known geological events of significant magnitude from earlier times. Thus, stanza 27 states:

OY wi di wifini clungin,
Da di marin cisamine sprungin,
Herehorn duzzin,
Becche blütis vluzzin,
Derde diruntini diuniti,
Di helli ingegine gliunte,
Da di heristin in der werilte
Sühtin sich mit suertin.
Dü gelach dir manig breiti scari
Mit blüte birunnin gari,
Da mohte man sin douwen
Durch helme virhouwin
Des richin Pompeiis man
Da Cesar den sige nam.

. . . and further in stanza 31:

IN des Augusti citin gescahc
Daz Got vane himele nider gesach
Dü ward giborin ein Küning
Demi dienit himilschi dugint,
Iesus Christus Godis Sun
Von der megide Sente Mariun:
Des erschinin san ci Rome
Godis zeichin vrone,
Vzir erdin diz luter olei spranc,
Scone ranniz ubir lant,
Vmbe diu Sunnin ein creiz stunt,
Also roht so viur unti blut,
Wanti dü bigondi nahin,
Dannin uns allin quam diu genade,
Ein niuwe Künincrichi,
Demi müz diu werilt al intwichin.

3.0.1 The Chiemgau Impact Hypothesis and Its Potential Role in CDF Reactivation

A connection to the so-called *Chiemgau comet*, which is believed to have occurred between 2200 BC and 300 BC, is also conceivable. This hypothesis is supported not only by the temporal and spatial proximity to the areas potentially affected by such an event in the scenario below, but also by the previously determined entry path of the Chiemgau object, which is thought to have originated from the northeast. Upon entering the atmosphere, the comet may have undergone further fragmentation. The strewn field associated with the Chiemgau event might represent only a fraction of a much larger strewn field. (cf. Ernstson & Poßekel (2024)[8] in this context.) In the year 563 AD, the *Tauredunum event* also occurred, as recorded in contemporary accounts. This event

[6] Bemmann (2023)
[7] Volkmann (2013)
[8] Ernstson & Poßekel (2024)

Figure 9. cf. Figure 10. It is possible that an impact occurred in the area of the Carpathians, as suggested by the author in this interpretation. Perhaps it was an airburst, possibly near the present-day city of Tábor in the Czech Republic, which could have consequently caused a shift in the position of the residual mountain range. Today, the Bohemian Forest might possibly be considered a remnant of the Carpathians. At the same time, this opens up the possibility of an identical cause to the Chiemgau impact.

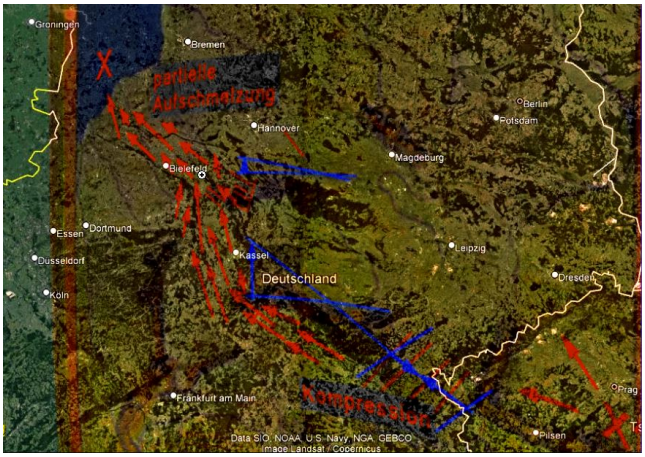

Figure 10. When comparing the medieval map with current satellite images, it might indeed appear, in the search for further evidence, that the circular structure between Osnabrück and Cloppenburg (see Samtgemeinde Artland) could also represent a younger impact crater (cf. Bramscher Pluton). The entire topography of Central Germany seems to orient itself toward this structure, including the Harz Mountains and particularly the Thuringian Forest, which might have been displaced or drawn northwestward—possibly as a partially molten subsurface mass—along the Teutoburg Forest and the Wiehengebirge. This hypothetical crater structure may have been subsequently filled with trailing rock material. In this process, the Thuringian Forest as a whole might have experienced a change in its strike direction (strike rotation) of about 45 degrees clockwise. Similarly, the Ore Mountains (Erzgebirge) also seem to exhibit such a clockwise rotation when compared to historical map representations.

Figure 11. AI-generated Impact Scenario. This is merely an artistic and imaginative depiction, with no claim to accuracy. It serves only as an illustrative example of the described situation shortly after a possible impact event, likely exaggerated to a significant degree.

involved a massive landslide, which triggered a large tsunami in *Lake Geneva* – possibly the result of significant tectonic stresses on the affected rock formation, potentially linked to an impact event that might have occurred around the same time.

3.1 Potential Consequences of the Previously Described Events and Their Possible Connection to the Geodynamics of Northern and Central Europe

The publication initially assumed post-glacial land uplift to be the main cause of a marine regression, which, in conjunction with the end of a warm period (the Roman climatic optimum), could consequently have led to a falling relative sea level (RSL) on the North German coast. Previously, even less water may have been bound in glacial ice than after the *Little Ice Age* in the Late Middle Ages – i.e. in the last five hundred years up to almost the present day. The work of Olav Liestøl was used in this consideration, who in the late 1950s evaluated the course of the firn line of western Norwegian glaciers over a period of about 10,000 years.[9]

Also according to W. Dansgaard et al. (1969)[10], Schönwiese (1995) and Roth (2018), and not least the word etymology of Greenland as "Greenland" [5], already indicate that the average temperature at the time of Ptolemy and during the Middle Ages was higher over longer periods than in the last five hundred years, and that Greenland was initially perceived as green and thus as fertile when it was named. Erik the Red is considered one of the first Vikings to settle Greenland at that time. His life is reported in Nordic sagas, here especially in the Eiríks saga rauða.

It is also conceivable that, during the period between the birth of Christ and the beginning of the *Little Ice Age*, a significant number of fortifications, castles, and even entire cities were built on shallow waters, former islands, and peninsulas (compare this to the **Legend of Vineta**, and particularly on pile dwellings as found near the Polish

[9] *Glaciers of the present day.* In: Olaf Holtedahl Geology of Norway, Norges Geologiske Undersökelse, Nr. 208. Oslo, 1960
[10] Dansgaard et al. (1969)

towns of *Dobiegniew*, *Chłopowo* (Krzęcin), and *Lubiatowo* (Przelewice)).

On the island groups in northern *Germania Magna*, Nordic seafaring peoples – ancestors and relatives of the Vikings – may have initially developed (compare also *Varangians*), or later the Vikings themselves, perhaps due to the expansionist pressure of the Roman Empire, which may have forced the Germanic tribes from the mainland onto the islands in the *Oceanus Germanicus* – or because they had lost their original settlements due to the previous transgression. The inhabitants of the North may also have temporarily lived on protected marshy islands (Halligen), or it is possible that these structures were later silted up or destroyed by floods, without leaving any traces today.

Due to geological events associated with a shift in the coastline, the *Migration Period* could also have begun[11], unless warlike conflicts were the primary motive. The Bohemian chronicler *Cosmas of Prague*, in reference to the later Slavic repopulation of Central Europe by *Boemus* (Czech) and his companions, even speaks of a 'deluge' by which the land was once deprived of its inhabitants.[12]

Considering the present interpretation, the author also considers it possible that historically recorded storm surges in the North– and Baltic Seas could, at least in part, be attributed to tectonic events such as earthquake-induced tsunamis (compare to Mandränke). Here too, a possible cosmic event, as mentioned earlier, cannot be entirely ruled out as a possible cause. For instance, the uplift of the island of Rügen, likely caused by the thrusting motion of Avalonia due to various events, might have occurred in relatively recent geological times, representing the remaining eroded tip of the Avalonian Plate.

A better understanding of the processes that might have taken place here could potentially lead to improved interpretations of archaeological finds, such as shipwrecks discovered on land [8]. These finds might initially be interpreted as grave goods or so-called boat burials, as they have often been discovered in Mecklenburg-Vorpommern.[13] However, in some cases, they could also be remnants of sunken "paddle boats," which may have been destroyed during battles or catastrophic events in what were originally shallow waters. Such waters might have extended far inland in earlier times if Ptolemy's records are interpreted correctly here.

Thus, unexpected events like tsunamis or volcanic eruptions could be considered as potential causes for a sunken boat, especially if a future discovery provides evidence of an impact event. Such boats could have been naturally covered by sand and silt through the process of sedimentation later, which might warrant separate consideration when interpreting such finds.

"Around the middle of the fourteenth century, the lands between the Elbe and Oder presented a sorrowful picture. The Lord, who created heaven and earth, distributed sunlight unevenly across the lands. Yet, where the German tongue faded and the Slavic began, His gift of sunlight was scarce. It lacked the power to dry the marshes left behind by the sea, to penetrate the dense, unyielding forests, or to warm the soil sufficiently for it to willingly nourish the generations of people swept there by the tide of nations. To these generations, the Lord assigned a daunting task: to wrestle with nature. They were to shape the soil through struggles with storms and waters, to lay out a carpet for the warming sun to linger upon with pleasure, and to create a land that would be dear to them and a joy to behold for others.

It was a harsh task; and though many centuries have passed since, it remains unfinished even today. They still toil, sweating to tame and solidify the sand that the wind carries away beneath the plowshare. Yet, the work done by the arm and guided by the hand is not enough; for such efforts alone cannot subdue lifeless nature nor compel the sun to shine brighter upon the reclaimed land. Their labor demands the aid of the spirit to invent new means and to kindle another light where the sun's rays cannot penetrate through the northern mists.

How often was this labor interrupted! And just when it seemed that the harvest was finally within reach. Such interruptions were often terrifying and dreadful, to the point where the faint-hearted despaired and the timid believed that God's wrath weighed upon the land, making resistance to His hand seem futile. But these trials were not the scourge of His wrath; they were tests and fire-temperings for a generation meant to learn never to lose heart. Just as they had struggled with the poverty of the soil and the elements for a better existence, they were also to fight through misfortunes and steel themselves for independence under the blows that always strike the weak the hardest when mighty forces clash."

- from a landscape description of the area along the Elbe and Oder River, in: Willibald Alexis' *The False Woldemar*

3.2 Possible Uplift of the *Avalonian Continental Plate* by the Mountain Building Process and the Reactivation of the Caledonian Deformation Zone (CDF)

The onset of Avalonian thrusting may have also led to a stronger crustal thickening in the region of the Netherlands and the North German Wadden Sea. This, in turn, could have resulted in a tilting of the Avalonian continental plate or the surface topography (isostasy). The cause of this may have been a north-south directed force in the context of the Alpine orogeny, which could have led to an uplift of the North German coastal area and the *Central European Basin*, and perhaps also to a further uplift of the *Erzgebirge* (Ore mountains) in more

[11] Considering an impact theory, approximately between 526–531 AD, this period could at least correspond to 'a late phase of the Migration Period,' for example, with the invasion of the Lombards into Italy. Earlier, there had already been conquest campaigns by other Germanic tribes emerging from *Germania Magna*, such as the Vandals reaching as far as North Africa. However, such an event could also have occurred earlier, perhaps closer to the time around Christ's birth or even approximately 10,000 years ago.

In this case, the map representation of *Germania Magna* would also need to be considerably older than previously assumed. A notable change in relative sea level can, for instance, be demonstrated for Scandinavia and was described by Lambeck et al. (1998) in '*Sea-level change, glacial rebound and mantle viscosity for northern Europe*. This change, however, is very likely, according to current knowledge, primarily related to postglacial land uplift following the end of the Ice Age and apparently occurs over an extended period. Nevertheless, potential dating errors should also be considered here

[12] cf. Biermann (2005)

[13] cf. Biermann (2004)

recent geological times, or generally to an uplift of the low mountain ranges along the *Thuringian-Franconian-Vogtland Slate Mountains*, further along the *Main* river to the *Rhenish Slate Mountains*, including the *Taunus* and *Hunsrück*.

This could also have caused a northwest tilt of the *Avalonian continental plate*, also because a (limited) obduction onto *Baltica* could not have occurred equally at all sutures, since *Avalonia* was overlain by *Laurentia* in the west. Particularly in the area of Denmark, this likely represents the collision of two continental plates rather than the subduction of oceanic crust, as seen along the western coasts of North and South America. It might be considered a transitional situation.

Please also refer to the work of Lyngsie & Thybo (2007): *A new tectonic model for the Laurentia-Avalonia-Baltica sutures in the North Sea: A case study along MONA LISA profile 3*[14], which shows that the continental crust of *Baltica* had already begun to fold in the study area (at *Caledonian foreland thrust belt*), presumably as a prelude to the formation of an accretionary wedge in the Jutland area, with the possible further consequence of a northward displacement of the *Sorgenfrei-Tornquist Zone* due to the forces acting here.

A comparable event has taken place in the past, for example, to a greater extent in the collision of India with Eurasia[15] (cf. Jiang et al. (2022)). In essence, this would represent the initial stage of mountain building, which may have been interrupted along the North German coast due to the wedging of three continental plates (Avalonia, Baltica, and Laurentia). Therefore, stronger forces would be required at this point to continue the process, which can already be traced here through the depiction of *Germania Magna*. Thus, the process of Alpine orogenesis may have shifted in our time from the Alps more towards Scandinavia, depending on the activity of the Mid-Atlantic Ridge and the force exerted on Europe by the collision with the African continental plate.

It should also be noted that the uplift likely occurred in phases of varying intensity, rather than as a uniform process of mountain building. There must have been periods of heightened activity to produce the necessary landscape changes (geomorphological alterations). In Northern Europe, such processes have rarely been recognized as significant, likely because they are currently in a less conspicuous phase of activity since the advent of modern geosciences.

It is also worth mentioning that the shortening of the continental crust in length obviously also goes hand in hand with its uplift, which leads to graben fractures in the hinterland. (cf. again Jiang et al. (2022))

Thus, the *Eger Graben* may also have been more closely related to this process, or have been caused by earlier (perhaps even periodically occurring) events of the same nature. Likewise, however, it should also be considered whether the *Elbe Valley Basin* between Meißen and Dresden could ultimately be a result of such processes. In my opinion, the Germania Magna indicates that the area around the *Elbe Sandstone Mountains* and the Lusatian Mountains could have experienced geomorphological changes in the meantime (please refer again to the previous Chapter 3.0.1 '*The Chiemgau Impact Hypothesis and Its Potential Role in CDF Reactivation*' in this context).

According to the description of the *Germania Magna*, the *Erzgebirge* was already present, but it is difficult to say whether it may not have experienced another uplift in recent geological times, which is related to the tectonic-induced regression of the *Oceanus Germanicus*, or a (further) subsidence of the *Erzgebirge foreland*, as a result of a beginning overthrust of the continental crust at the coast – and, as already indicated, with the associated shortening of the continental crust in the interior of the country – although, according to the previous view, such processes should essentially have taken place at a much earlier point in time. However, even after the relief of the crust by the decrease of the force effect (relaxation), graben structures could probably still form.

The approach of Scandinavia to Central Europe has probably also led to the formation of the *North Sea Central Graben*, as a bulge of the continental crust, (cf. Arfai et al. (2018))[16]. Former land areas in the North Sea, such as *Albionis pars*, likely became part of this rift structure and subsequently fell below today's sea level. This may also have a closer connection to the opening of the *Upper Rhine Graben* (cf. *Mediterranean-Mjösen Zone*).

It is therefore conceivable that there is a closer connection between the current uplift of Scandinavia and the Alpine orogeny than previously assumed, suggesting that postglacial land uplift may only partially account for this phenomenon. The relatively rapid uplift of Scandinavia in recent times could possibly be attributed to folding processes in the continental crust, forming anticlines in the land areas and synclines in oceanic structures such as the Baltic Sea.

4 *Excursus:* The Continental Drift Considering Plato's Description of Atlantis and Additional Speculations on Germany's Geological History

An alternative idea regarding the speed at which the continents drifted apart in recent geological history could provide an explanation for the possible thrusting of *Avalonia* (see also Alfred Wegener's theory of continental drift).

In this context, we consider Plato's description of *Atlantis*, famously described as "*an island in the Atlantic*" with a north-south orientation and a size "*exceeding that of Libya in extent.*" At the time of Plato, Libya was understood as the entirety of North Africa, excluding Egypt and the known parts of the Near East. Therefore, historical *Atlantis* might very well correspond to a larger part of North America today, such as the *Rocky Mountains* or the *American Cordillera*, which, in the past, could have appeared as an expansive island arc when North America was closer to Europe. South America, too, might have separated from the African continent much later than currently assumed if we take Plato's account of *Atlantis* more seriously as part of this thought experiment. Additionally, the medieval world map by Donnus Nicolaus Germanus, based on the work of Ptolemy and his predecessors from antiquity, such as Marinus of Tyre, described a long island marking the boundary of the known world, further supporting this hypothesis.

For the ring-shaped *Atlantis* described by Plato, the *Colorado Plateau* and the *Four Corners region*, including *Monument Valley*, fit this description, measuring approximately 555 kilometers by 370 kilometers (or 3,000 stadia by 2,000 stadia), as Plato recorded. This region also contains limestone

[14] Lyngsie & Thybo (2007)
[15] Jiang et al. (2022)
[16] Arfai et al. (2018)

Figure 12. The world map from Leinhart Holle's 1482 edition of Nicolaus Germanus's emendations to Jacobus Angelus's 1406 Latin translation of Maximus Planudes's late-13th century rediscovered Greek manuscripts of Ptolemy's 2nd-century Geography. South America might have separated from the African continent much later than currently assumed, if we take this map more seriously.

Figure 13. Martin Waldseemüller's world map, including inset maps of Ptolemy's Old World and Amerigo Vespucci's account of the New World, 1507. The *North-American Cordillera* could have appeared as an expansive island arc when North America was still closer to Europe.

deposits and copper—key components of the mystical metal Orichalcum, identified by the Romans as an alloy of copper and zinc (brass). Elephant or mammoth remains, which Plato claimed were abundant in the area, have also been discovered in the U.S., such as at the *La Brea Tar Pits* near Los Angeles, as well as in *Blackwater Draw* and *Murray Springs*.

The Colorado Plateau was uplifted by the subduction of the *Farallon Plate*, rising approximately 1,800 to 2,500 meters (most recently in the late Cenozoic). It is conceivable that the entire North American continent may have been more or less significantly uplifted in the process or that the relative sea level dropped due to the impact of cosmic objects. Such an event could have released significant thermal and kinetic energy. In such a scenario, the receding seawater might have initially accumulated in large inland lakes, such as *Lake Bonneville*, which could later shrunk to the size of the modern *Great Salt Lake* near Salt Lake City.

The eastern United States and parts of what are now considered central regions may, according to cartographic evidence, have still been below sea level, while the Indian continental plate on the opposite side of the Earth was presumably continuing its drift toward Eurasia. This suggests that the Himalayas had not yet reached their current elevations at that time. Similarly, the northern part of India might also have remained below sea level during this period.

The accelerated rate of continental drift since the last major Ice Age could help explain the forces necessary for the thrusting of Avalonia onto Baltica. It also aligns with the hypothesis of a cosmic impact as a contributing factor, as described earlier in this interpretation. Such an event occurring along the west coast of Africa could have triggered the separation of South America from the African continental plate (see ***Figure 12***).

It is important to note that the maps in question may have been imprecisely compiled, possibly from fragmented sources, resulting in inaccuracies in geographical representation. Moreover, the full size and extent of the North American continent may not have been entirely known at the time. The descriptions of Central Germany and other regions of the world that are used by Ptolemy and subsequent cartographers up to the High Middle Ages were probably not always precise or based on consistent data.

Nevertheless, there are indications that these maps may be more accurate than initially assumed. The landscape may have undergone significant transformations in relatively recent times. This interpretation remains a hypothetical model, relying on the presumed accuracy of ancient records to explore possible explanations for landscape transformations. It deliberately excludes archaeological evidence and modern geological field observations, assuming potential misinterpretations or misdatings, such as those caused by sedimentary gaps or soil liquefaction.

Within this framework, the hypothesis of an impact event involving an icy meteorite—possibly debris from *Halley's Comet*—could also be considered—or a connection with the *Chiemgau-Event*, as described earlier. Such an event might have occurred in the *Czech Republic*, leading to the subsidence of a portion of the lithosphere and the subsequent rise of a pluton (cf. *Bohemian Massif* or *Bohemian Pluton*). Alternatively, it might involve an intrusion related to large-scale crustal extension caused by the remote effects of a cosmic impact, potentially affecting areas in *Saxony*, *Saxony-Anhalt* (*Elbe Zone*), and *Franconia*.

In the Germania Magna representation by Donnus Nicolaus Germanus, the *Sudete Montes* could be aligned with the *Thuringian Forest*, while the Elbe (albis fluvii) could correspond to today's *Saale* River, the *Weida*, or the *White Elster*, with the latter name linguistically linked to albis (Latin for "white"). Meanwhile, the *Sarmate Montes* might represent the Ore Mountain range (*Erzgebirge*), possibly in a proto-form (see again **3.0.1**: *The Chiemgau Impact Hypothesis and Its Potential Role in CDF Reactivation*).

It's possible that the entire Avalonian plate may have been stretched northward or even migrated, as if it had floated on the underlying asthenosphere, which might have been more liquefied by a meteorite impact. As a consequence, the aforementioned regions in *Franconia* or *Saxony* might have attained their current extent in this way.

Perhaps due to the imprecision of ancient records, the *Harz*

mountains appear to be significantly reduced in their original east-west extent when compared to the Germania Magna map. It seems as if they have, in a sense, 'submerged' westward, with the remnants of their original expanse now forming parts of the *Weser-Leine Uplands* and the *Alfeld Uplands*. Whether this could have been a rather sudden result of an impact event or if a viscous, ductile flow of the landscape towards the northwest occurred over several months remains to be determined. However, such a process would first need to be substantiated through further research and evidence.

An impact event in the area of the crystalline basement of the 'Carpathians' and the (Proto-)*Erzgebirge*, as previously described, would likely have produced an SiO2-rich rhyolitic melt. This may also have resulted in a thick sequence of tuff layers deposited by explosive volcanism, which could have been triggered by such an event.

A process similar to the formation of the *Chemnitz Petrified Forest*, where the well-known *Zeisigwald tuff* was deposited, could be linked to explosive volcanism. This tuff, which now occurs relatively close to the surface, is a solid rock due to its high content of silica-rich magma or pyroclastics. In this way, a connection to the formation of the Rochlitz Porphyry Mountain or the *Baruth Volcano* in eastern Saxony is also conceivable. Such evidence should also be found here to prove impact-induced volcanism that may have occurred during such an event.

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